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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/593,784	09/22/2006	Yuriko Suzuki	296731US40PCT	4031
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OBLON, SPIVAK, MCCLELLAND MAIER & NEUSTADT, L.L.P. 1940 DUKE STREET ALEXANDRIA, VA 22314			EXAMINER WEST, JEFFREY R	
			ART UNIT 2857	PAPER NUMBER
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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

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Office Action Summary	Application No. 10/593,784	Applicant(s) SUZUKI ET AL.	
	Examiner Jeffrey R. West	Art Unit 2857	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 19 June 2008.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-12 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-12 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 22 September 2006 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date <u>09/22/06 and 07/05/07</u> . | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

1. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

Drawings

2. The drawings are objected to as failing to comply with 37 CFR 1.84(p)(5) because they include the following reference character(s) not mentioned in the description: "S21", "S22", "S26", and "S27" (Figure 16).

3. Corrected drawing sheets in compliance with 37 CFR 1.121(d), or amendment to the specification to add the reference character(s) in the description in compliance with 37 CFR 1.121(b) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. Each drawing sheet submitted after the filing date of an application must be labeled in the top margin as either "Replacement Sheet" or "New

Sheet” pursuant to 37 CFR 1.121(d). If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

Specification

4. The disclosure is objected to because of the following informalities:

On page 15, line 25, “an ark” should be ---an arc---.

On page 17, line 25, “By the way, actually, as shown” should be ---As shown---.

Appropriate correction is required.

Claim Objections

5. Claims 1, 4, 5, 9, and 10 are objected to because of the following informalities:

In claim 1, line 2, to avoid confusion, “a force sense” should be something similar to ---a sensed force---.

In claim 1, line 12, to avoid problems of antecedent basis, “the incline side” should be ---the inclined side---.

In claim 4, line 10, to avoid problems of antecedent basis, “the nozzle” should be ---the selected nozzle---.

In claim 5, line 2, to avoid confusion, “a force sense” should be something similar to ---a sensed force---.

In claim 9, line 3-4, to avoid confusion, "a force sense" should be something similar to ---a sensed force---.

In claim 10, line 9, to avoid problems of antecedent basis, "measurement unit" should be ---measurement means---.

Appropriate correction is required.

Claim Rejections - 35 USC § 112

6. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

7. Claims 1-12 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claims 1-4 are considered to be vague and indefinite because they are drawn to a method that includes both machine (i.e. *inter alia* jetting means, nozzle, receiver, etc.) and process (i.e. *inter alia* steps of providing a force, calculating a virtual object, etc.) limitations, and therefore fail to comply with the requirements of 35 U.S.C. 112, second paragraph, because it is unclear as to which statutory class of invention to which the claims are drawn. (See MPEP § 2173.05(p))

Claim 5 is considered to be vague and indefinite because it is drawn to "A force feedback apparatus" that comprises a "jet control means" and "receiver measurement means that is connected to the force feedback apparatus". It is, therefore, unclear to one having ordinary skill in the art as to how the "receiver

measurement means" can properly further limit a "force feedback apparatus" when it is claimed as being connected to the force feedback apparatus.

Claim 6 is further considered to be vague and indefinite because it attempts to further limit the "force feedback apparatus" of claim 5, while further limiting the receiver that is connected to the force feedback apparatus, rather than the apparatus itself, by specifying "wherein the receiver is provided with a deformation mechanism for changing a position or an orientation of the inclined side surface unit".

Claims 9-12 are considered to be vague and indefinite because they are drawn to a program that includes both machine (i.e. *inter alia* jet control means, nozzle, receiver, etc.) and process (i.e. *inter alia* steps of presenting a force sense, changing a position or an orientation of the inclined surface unit, calculating a virtual object, etc.) limitations, and therefore fail to comply with the requirements of 35 U.S.C. 112, second paragraph, because it is unclear as to which statutory class of invention to which the claims are drawn. (See MPEP § 2173.05(p))

Claims 7 and 8 are rejected under 35 U.S.C. 112, second paragraph, because they incorporate the lack of clarity present in parent claim 5.

Claim Rejections - 35 USC § 101

8. 35 U.S.C. 101 reads as follows:

Whoever invents or discovers any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof, may obtain a patent therefor, subject to the conditions and requirements of this title.

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9. Claims 1-4 and 9-12 are rejected under 35 U.S.C. 101 because the claimed invention is directed to non-statutory subject matter.

Claims 1-4 are considered to be vague and indefinite because they are drawn to a method that includes both machine (i.e. *inter alia* jetting means, nozzle, receiver, etc.) and process (i.e. *inter alia* steps of providing a force, calculating a virtual object, etc.) limitations, and therefore fail to comply with the requirements of 35 U.S.C. 101 because they embrace or overlap two different statutory classes of invention set forth in 35 U.S.C. 101 which is drafted so as to set forth the statutory classes of invention in the alternative only. (See MPEP § 2173.05(p)).

Claims 9-12 are considered to be vague and indefinite because they are drawn to a program that includes both machine (i.e. *inter alia* jet control means, nozzle, receiver, etc.) and process (i.e. *inter alia* steps of presenting a force sense, changing a position or an orientation of the inclined surface unit, calculating a virtual object, etc.) limitations, and therefore fail to comply with the requirements of 35 U.S.C. 101 because they embrace or overlap two different statutory classes of invention set forth in 35 U.S.C. 101 which is drafted so as to set forth the statutory classes of invention in the alternative only. (See MPEP § 2173.05(p)).

Claims 9-12 are also rejected under 35 U.S.C. 101 because they are drawn to a computer program *per se* that does not define any functional interrelationships between the computer program and other claimed aspects of the invention which permit the program's functionality to be realized. It has been held that such a program is considered to be non-statutory under 35 U.S.C. 101 (See e.g.,

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Warmerdam 33 F.3d at 1361. 31 USPQ2d at 1760 and Lowry, 32 F.3d at 1583-84, 32 USPQ2d at 1035).

Claim Rejections - 35 USC § 102

10. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

11. Claims 1-5, 7-9, 11, and 12, as may best be understood, are rejected under 35 U.S.C. 102(b) as being anticipated by Suzuki et al, “Arrayed Air Jet Based Haptic Display: Implementing an Untethered Interface”.

With respect to claim 1, Suzuki discloses a force feedback method for presenting a force sense to an operator by jetting gas or liquid from a nozzle of jetting means according to a position or an orientation of a receiver (page 1, column 1, lines 1-13 and page 1, column 2, lines 6-20), wherein the receiver is provided with an inclined side surface unit shaped to be inclined, outward from a center part of the receiver, with respect to an axis line of the receiver (i.e. a dome shape with side units that curve outward from a center axis line of the receiver at a position sensor) (Figures 1 and 2), comprising: providing a force, to the receiver, including a component perpendicular to a jet direction of the gas or the liquid by jetting the gas or the liquid to the incline side surface unit (i.e. due to the curvature of the receiver, when the air

hits the curved side of the receiver, the force received inherently includes a perpendicular force) (page 2, lines 3-17 and Figures 1 and 2).

With respect to claim 2, Suzuki discloses wherein a position or an orientation of the inclined side surface unit is changed according to the position or the orientation of the receiver (i.e. when the receiver is moved from a current position to a new position, the position of the inclined side surface unit moves accordingly) (page 2, column 1, lines 3-17 and Figures 1 and 2).

With respect to claim 3, Suzuki discloses calculating a virtual object according to the position or the orientation of the receiver so as to display a virtual space including the virtual object based on a result of the calculation (page 1, column 1, lines 1-13 and page 2, column 1, lines 3-21).

With respect to claim 4, Suzuki discloses wherein the jetting means has a structure where a plurality of nozzles are arranged on a plane, and the receiver is placed at a predetermined height on the plane (page 1, column 2, lines 17-25 and Figures 1 and 2), the force feedback method comprising: selecting a nozzle that is positioned between an inner border of the inclined side surface unit of the receiver and an outer border of the inclined side surface unit wherein an angle difference between a direction from the nozzle to the center of the receiver and a direction of the force to be provided to the receiver is equal to or less than a predetermined value; and jetting the gas or the liquid from the selected nozzle (i.e. A nozzle is independently selected when the receiver is detected to be above the nozzle. Detection above the nozzle is based on a determination that the nozzle lies within an

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outer border of the dome and an inner border of the receiver. Further, when the nozzle is selected due to the receiver being determined to be above the nozzle, an angle difference between a direction from the nozzle to the center of the receiver and a direction of the force to be provided to the receiver is approximately zero since force to be provided is a force directly vertical and the direction from the nozzle to the center of the receiver is also directly vertical) (page 1, column 2, line 17 to page 2, column 1, line 2, page 2, column 1, lines 3-17 and 38-48, and Figures 1 and 2).

With respect to claim 5, Suzuki discloses a force feedback apparatus used for a force feedback method for presenting a force sense to an operator by jetting gas or liquid from a nozzle of jetting means according to a position or an orientation of a receiver (page 1, column 1, lines 1-13 and page 1, column 2, lines 6-20), comprising: jet control means for controlling a jet amount or a jet direction of the gas or the liquid jetted from the nozzle of the jetting means according to a position or an orientation of the receiver measured by receiver measurement means that is connected to the force feedback apparatus (page 1, column 2, line 17 to page 2, column 1, line 2, and page 2, column 1, lines 3-17 and 38-48), wherein the receiver is provided with an inclined side surface unit shaped to be inclined, outward from a center part of the receiver, with respect to an axis line of the receiver (i.e. a dome shape with side units that curve outward from a center axis line of the receiver at a position sensor) (Figures 1 and 2), and the jet control means controls the jetting means so as to jet the gas or the liquid to the inclined side surface unit in order to provide a force, to the receiver, including a component perpendicular to a jet

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direction of the gas or the liquid (i.e. due to the curvature of the receiver, when the air hits the curved side of the receiver, the force received inherently includes a perpendicular force) (page 2, lines 3-17 and Figures 1 and 2).

With respect to claim 7, Suzuki discloses virtual object calculation means for calculating a virtual object in a virtual space according to the position or the orientation of the receiver measured by the receiver measurement means, and causing virtual object display means to display the virtual space including the virtual object based on a result of the calculation (page 1, column 1, lines 1-13 and page 2, column 1, lines 3-21).

With respect to claim 8, Suzuki discloses wherein, when the jetting means has a structure where a plurality of nozzles are arranged on a plane, and the receiver is placed at a predetermined height on the plane (page 1, column 2, lines 17-25 and Figures 1 and 2), the jet control means selects a nozzle that is positioned between an inner border of the inclined side surface unit of the receiver and an outer border of the inclined side surface unit wherein an angle difference between a direction from the nozzle to a center of the receiver and a direction of the force to be provided to the receiver is equal to or less than a predetermined value, and causes the selected nozzle to jet the gas or the liquid in order to provide a force, to the receiver, including a component perpendicular to a jet direction of the gas or the liquid (i.e. A nozzle is independently selected when the receiver is detected to be above the nozzle. Detection above the nozzle is based on a determination that the nozzle lies within an outer border of the dome and an inner border of the receiver. Further,

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when the nozzle is selected due to the receiver being determined to be above the nozzle, an angle difference between a direction from the nozzle to the center of the receiver and a direction of the force to be provided to the receiver is approximately zero since force to be provided is a force directly vertical and the direction from the nozzle to the center of the receiver is also directly vertical) (page 1, column 2, line 17 to page 2, column 1, line 2, page 2, column 1, lines 3-17 and 38-48, and Figures 1 and 2).

With respect to claim 9, Suzuki discloses a program for causing a computer (page 1, column 1, lines 1-13 and page 2, column 1, lines 3-21) to realize functions of a force feedback apparatus used for a force feedback method for presenting a force sense to an operator by jetting gas or liquid from a nozzle of jetting means according to a position or an orientation of a receiver (page 1, column 1, lines 1-13 and page 1, column 2, lines 6-20), the program causing the computer to function as: jet control means for controlling a jet amount or a jet direction of the gas or the liquid jetted from the nozzle of the jetting means according to a position or an orientation of the receiver measured by receiver measurement means that is connected to the computer (page 1, column 2, line 17 to page 2, column 1, line 2, and page 2, column 1, lines 3-17 and 38-48), wherein the receiver is provided with an inclined side surface unit shaped to be inclined, outward from a center part of the receiver, with respect to an axis line of the receiver (i.e. a dome shape with side units that curve outward from a center axis line of the receiver at a position sensor) (Figures 1 and 2), and the jet control means controls the jetting means so as to jet the gas or the

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liquid to the inclined side surface unit in order to provide a force, to the receiver, including a component perpendicular to a jet direction of the gas or the liquid (i.e. due to the curvature of the receiver, when the air hits the curved side of the receiver, the force received inherently includes a perpendicular force) (page 2, lines 3-17 and Figures 1 and 2).

With respect to claim 11, Suzuki discloses the program further causing the computer to function as: virtual object calculation means for calculating a virtual object in a virtual space according to the position or the orientation of the receiver measured by the receiver measurement means, and causing virtual space display means to display the virtual space including the virtual object based on a result of the calculation (page 1, column 1, lines 1-13 and page 2, column 1, lines 3-21).

With respect to claim 12, Suzuki discloses when the jetting means has a structure where a plurality of nozzles are arranged on a plane, and the receiver is placed at a predetermined height on the plane (page 1, column 2, lines 17-25 and Figures 1 and 2), the jet control means selects a nozzle that is positioned between an inner border of the inclined side surface unit of the receiver and an outer border of the inclined side surface unit wherein an angle difference between a direction from the nozzle to a center of the receiver and a direction of the force to be provided to the receiver is equal to or less than a predetermined value, and causes the selected nozzle to jet the gas or the liquid in order to provide a force, to the receiver, including a component perpendicular to a jet direction of the gas or the liquid (i.e. A nozzle is independently selected when the receiver is detected to be above the

nozzle. Detection above the nozzle is based on a determination that the nozzle lies within an outer border of the dome and an inner border of the receiver. Further, when the nozzle is selected due to the receiver being determined to be above the nozzle an angle difference between a direction from the nozzle to the center of the receiver and a direction of the force to be provided to the receiver is approximately zero since force to be provided is a force directly vertical and the direction from the nozzle to the center of the receiver is also directly vertical) (page 1, column 2, line 17 to page 2, column 1, line 2, page 2, column 1, lines 3-17 and 38-48, and Figures 1 and 2).

Claim Rejections - 35 USC § 103

12. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

13. Claims 6 and 10, as may best be understood, are rejected under 35 U.S.C.

103(a) as being unpatentable over Suzuki et al. in view of JP Patent Application Publication No. 2004-157677 to Iwaki et al.

As noted above, the invention of Suzuki teaches many of the features of the claimed invention and while the invention of Suzuki does teach a force feedback method/apparatus wherein a position or an orientation of an inclined side surface unit is changed according to a position or the orientation of the receiver, Suzuki is

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not explicit in providing a deformation mechanism for changing a position or an orientation of the inclined side surface unit, the force feedback apparatus further comprising receiver side surface unit control means for controlling the deformation mechanism according to the position or the orientation of the receiver measured by the receiver measurement unit.

Iwaki teaches a multi-flexible driving mechanism and virtual reality system for receiving force caused by jets of air as part of a force feedback apparatus (0001, lines 1-4 and 0010, lines 1-9) wherein a receiver is provided with a deformation mechanism for changing a position or an orientation of the inclined side surface unit (0012, lines 1-8 and 0014, lines 1-6), the force feedback apparatus further comprising receiver side surface unit control means for controlling the deformation mechanism according to the position or the orientation of the receiver measured by the receiver measurement unit (0023, lines 1-7, 0027, lines 1-16, and 0030, lines 1-11).

It would have been obvious to one having ordinary skill in the art to modify the invention of Suzuki to specify a deformation mechanism for changing a position or an orientation of the inclined side surface unit, the force feedback apparatus further comprising receiver side surface unit control means for controlling the deformation mechanism according to the position or the orientation of the receiver measured by the receiver measurement unit, as taught by Iwaki, because, as suggested by Iwaki, the combination would have improved the system of Suzuki by providing additional control and, consequently, more accurate force detection through use of a multi-

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flexibility drive mechanism (0023, lines 1-7, 0027, lines 1-16, 0030, lines 1-11, and 0041, lines 1-10).

Conclusion

14. The prior art made of record and not relied upon is considered pertinent to Applicant's disclosure.

U.S. Patent Application Publication No. 2004/0164960 to Jacobus et al. teaches a force feedback system and actuator power management.

U.S. Patent No. 6,433,771 to Yocum et al. teaches haptic device attribute control.

U.S. Patent No. 5,583,478 to Renzi teaches a virtual tactile system.

U.S. Patent No. 6,046,726 to Keyson teaches a virtual workspace with user-programmable tactile feedback.

U.S. Patent No. 5,459,382 to Jacobus et al. teaches a method and system for providing a tactile virtual reality and manipulator defining an interface device therefore.

JP Patent Application Publication No. 2001-022499 to Suzuki et al. teaches an inner force sense presenting device by wind pressure in virtual space.

Amemiya et al., "Portable Tactile Feedback Interface Using Air Jet" teaches portable force feedback displays.

15. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Jeffrey R. West whose telephone number is

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(571)272-2226. The examiner can normally be reached on Monday through Friday, 8:30-5:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Eliseo Ramos-Feliciano can be reached on (571)272-7925. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Jeffrey R. West/
Primary Examiner, Art Unit 2857

September 25, 2009